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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/041,786	01/07/2002	Hardayal Singh Gill	IBM1P006/SJ0920010087US1	3113

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SILICON VALLEY INTELLECTUAL PROPERTY GROUP  
P.O. BOX 721120  
SAN JOSE, CA 95172-1120

EXAMINER

KLIMOWICZ, WILLIAM JOSEPH

ART UNIT PAPER NUMBER

2652

DATE MAILED: 03/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/041,786

Applicant(s)

GILL ET AL

Examiner

William J. Klimowicz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano (JP 61-145720 A) in view of Hines et al. (WO 1/41214 A1).

As per claims 1, and 16-21, Hirano (JP 61-145720 A) discloses a magnetoresistance (MR) magnetic head (e.g., see FIGS. 1(a), 3(a) and 4(a)) and method for manufacturing such head, comprising: a first shield (e.g., left side shield (11) as designated in FIG. 1(a)) and a second shield (e.g., right side shield (11) as designated in FIG. 1(a)) defining a gap (at (15)) between poles (e.g., opposing edges of (11) at gap (15)) at air bearing surface - (see Fig. 1) *adapted* for being positioned over a magnetic recording disk, wherein the shields (e.g., left side and right side

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shield (11) as designated in FIG. 1(a)) are not in physical contact with each other; and a MR sensor (12) positioned between the first shield (e.g., left side shield (11) as designated in FIG. 1(a)) and the second shield (e.g., right side shield (11) as designated in FIG. 1(a)); wherein a plane in which the MR sensor (12) is positioned (e.g., plane of paper in FIG. 1) is perpendicular to magnetic flux (17) associated with the magnetic recording disk (disk would be positioned horizontally on top of and parallel to upper planar surface as seen in FIG. 1, in Fig. 5, in a manner known by those of ordinary skill).

As per claims 5 and 20, further comprising a first insulator layer (e.g., supporting material between the MR sensor (12) and the left side shield (11); and a second insulator layer (e.g., supporting material between the MR sensor (12) and the left side shield (11) positioned between the right side second shield (11) and the MR sensor (12). The insulator material can include, *inter alia*, substrate layer (21) and/or cover layer (25), etc.

As per claims 9, 16 and 21, wherein magnetic fields associated with the magnetic recording disk reside in the shields (11, 11) to afford a voltage in the MR sensor (12) upon an application of the current via sense current contacts, including contact ends (27, 28) and/or the conductive elements (14) and/or (46) as seen in FIG. 4), which apply a current to the magnetoresistive sensor, as per claim 6, wherein the plane is defined by a flow of current - which is parallel to the paper as seen in FIG. 1, as per claim 7, wherein the plane is further defined by the sensing field associated with the MR sensor (12), as per claim 8, wherein the shields are such that fields (17) applied to the magnetoresistive sensor (12) are in a direction perpendicular to the plane in which the MR sensor (12) is positioned.

As per claim 11, wherein a width of the shields at a first point (e.g., closest to (15)) on the

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shields (11, 11) proximate to a magnetic recording disk (at the aforementioned ABS) is less than a second point on the shields (11, 11) distant a magnetic recording disk (e.g., at midpoint of shield lengths, as seen in FIGS. 1, 3, 4, etc.)

As per claim 12, wherein the first point (e.g., closest to magnetic recording gap (15)) on the shield defines a track width - FIGS. 1, 3, 4.

As per claim 13, wherein at least a portion of the side edges of the shields (11, 11) taper outwardly from the first point to the second point on the shields (11, 11) - FIGS. 1, 3, 4.

As per claim 14, wherein the MR sensor (12) is positioned at the second point on the shields, the second point of each shield being positioned at an upper extent of the associated shield (11, 11) - Note that the gap distance (16) is larger than the gap distance at (15), e.g., in FIG. 1.

As per claim 15, wherein the first and second shields are constructed from a ferromagnetic material (e.g., see page 4, lines 15-16 of enclosed English translation of Hirano (JP 61-145720 A)).

As per claims 1 and 16-21, Hirano (JP 61-145720 A) does not expressly disclose wherein the MR (magnetoresistive) sensor is an extraordinary magnetoresistive sensor (EMR), in the manner prescribed by claims 1-4, 6-8, 10 and 16-21.

Hines et al. (WO 1/41214 A1) discloses a magnetoresistive sensor (MR) that is adapted to be used in a magnetic recording head sensor of the type disclosed by Hirano (JP 61-145720 A) (e.g., see page 1, second paragraph, page 6, second paragraph, of Hines et al. (WO 1/41214 A1)), wherein the MR sensor is an extraordinary magnetoresistive sensor (EMR) (as per claims 1 and 16-21); wherein the EMR sensor includes a semiconductor material (InSb) with impurities

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imbedded therein (e.g., see page 3, second paragraph of Hines et al. (WO 1/41214 A1)) (as per claim 2, 16 and 20); wherein the impurities include doping (e.g., see page 3, second paragraph of Hines et al. (WO 1/41214 A1)) (as per claim 3); wherein the impurities include Au (e.g., see page 9, fourth paragraph of Hines et al. (WO 1/41214 A1)) (as per claim 4, 16); wherein a current is applied to a pair of current contacts (53, 54) positioned on the EMR sensor (as per claims 6 and 20); wherein the plane is defined by a flow of the current (from contact (53) to contact (54)) (as per claims 7 and 20); wherein the plane is defined by a sensing field (either electric field or sensed field) associated with the EMR sensor - along a z-axis in FIG. 5) (as per claim 8); wherein a pair of voltage contacts (55, 56) is positioned on the EMR sensor for monitoring the voltage (as per claim 10).

Moreover, as per claim 16, a system is provided, comprising: a magnetic recording media that is capable of being associated with the head of Hirano (JP 61-145720 A); means for positioning a plane in which the MR sensor is positioned perpendicular to magnetic flux associated with the magnetic recording media (e.g., see FIG. 1, plane of media would be positioned horizontally, if depicted, in Fig. 1, in a manner known by those of ordinary skill).

Moreover, as per claim 17, a supporting structure (e.g. substrate (21)) is coupled to the MR sensor (12) for positioning the MR sensor (12) over a magnetic recording media such that a plane in which the MR sensor (12) is positioned is perpendicular to magnetic flux associated with a magnetic recording media.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the "extraordinary" magnetoresistive sensor as taught by Hines et al. (WO 1/41214 A1), as the magnetoresistive sensor of Hirano (JP 61-145720 A).

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide the “extraordinary” magnetoresistive sensor as taught by Hines et al. (WO 1/41214 A1), as the magnetoresistive sensor of Hirano (JP 61-145720 A), in order to dramatically increase the magnetoresistive sensitivity (i.e., the MR resistance ratio of  $\Delta R/R$ ) of the MR head at room temperatures, as explicitly taught and suggested by Hines et al. (WO 1/41214 A1).

Additionally, as per claim 19, although Hirano (JP 61-145720 A) as applied to Hines et al. (WO 1/41214 A1) does not expressly disclose an actuator for moving the read head across a magnetic recording disk, or as per claims 16, 17 and 19, wherein a disk is positively set forth, so the read head may access different regions of magnetically recorded data on the magnetic recording disk; and a controller electrically coupled to the read head for detecting changes in resistance of the read head, Official notice is taken that such actuators and controllers and disks for magnetoresistive-type sensors of the type expressly disclosed by Hirano (JP 61-145720 A), as applied to Hines et al. (WO 1/41214 A1), are notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the sensor of Hirano (JP 61-145720 A), as applied to Hines et al. (WO 1/41214 A1), with a conventional actuator and controller and disk (as opposed to, e.g. tape media) as prescribed in claims 16, 17 and 19.

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide the sensor of Hirano (JP 61-145720 A), as applied to Hines et al. (WO 1/41214 A1), with a conventional actuator and controller and disk (as opposed to, e.g. tape media) as

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prescribed in claims 16, 17 and 19 in order to access multiple recording tracks on a disk and sensing such tracks on a disk; disk media are well known in the art for providing random access memory, whereby the accessing of data is much faster than that of tape media; tape media is advantageous in that it can store vast quantities of data sequentially and has the capability of dwarfing the disk media in terms of data capacity; however, the trade-offs between the disk and tape media are well known in the art, and magnetoresistive sensors are interchangeable and compatible to both types of storage media, as is well known, established and appreciated in the art.

### *Response to Arguments*

Applicants' arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after



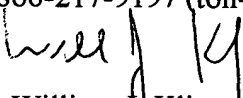
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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (703) 305-3452. The examiner can normally be reached on Monday-Thursday (6:30AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
William J. Klimowicz  
Primary Examiner  
Art Unit 2652

WJK